

PATENT ABSTRACTS OF JAPAN

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(54) STAINPROOFING AND DEODORIZING STRUCTURE AND INTERIOR MATERIAL UTILIZING THE SAME STRUCTURE

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain a stainproofing and deodorizing interior material capable of decomposing a material causing stain and odor by using a stainproofing and deodorizing structure obtained by dispersing titanium dioxide which is photocatalyst into a fluorine-based resin binder.

SOLUTION: This structure disperses (B) titanium dioxide fine powder into (A) fluorine-based resin binder, preferable in (10:1) to (1:10) ratio and the component B is exposed from at least binder surface. The structure is preferable formed by mixing an aqueous dispersion of the component B with an aqueous dispersion of the component B, applying or spraying the mixed liquid to the surface of the target of the interior, etc. and drying the liquid. The structure composed of the component A and the component B is preferable an unburned body. The thickness of the structure is preferable 1-50 μ m.

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CLAIMS

[Claim(s)]

[Claim 1] It is the antifouling deodorization structure characterized by for titanium-dioxide detailed powder having distributed in the fluororesin binder, and having exposed titanium-dioxide detailed powder from a binder front face at least.

[Claim 2] Antifouling deodorization structure of claim 1 where titanium-dioxide detailed powder was distributed at a rate of 10:1-1:10 in the fluororesin binder.

[Claim 3] Antifouling deodorization structure of claims 1-2 where the structure which consists of fluororesin and titanium-dioxide detailed powder is the non-calcinating body.

[Claim 4] Antifouling deodorization structure of claims 1-3 which distributed water-dispersion titanium-dioxide detailed powder in the water-dispersion fluororesin binder.

[Claim 5] Antifouling deodorization structure of claims 1-4 which this detailed powder comes to distribute in a binder while titanium-dioxide detailed powder is exposed to a fluororesin binder layer front face.

[Claim 6] Antifouling deodorization structure of claims 1-4 which carried out spreading desiccation of the mixture of a water-dispersion binder for water-dispersion titanium-dioxide detailed powder.

[Claim 7] It is the antifouling deodorization interior material characterized by for titanium-dioxide detailed powder having distributed in the fluororesin binder on an interior material body, and having exposed titanium-dioxide detailed powder from a binder front face at least.

[Claim 8] An interior material body is the interior material of claim 7 which is an organic material, an inorganic fiber cloth, or the non-calcinating ingredient that is one sort of these combination.

[Claim 9] Interior material which has the antifouling deodorization structure of claims 2-6 on a front face.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to antifouling deodorization structure and the interior material using it.

[0002]

[Description of the Prior Art] The titanium dioxide (TiO₂) of an anatase mold is well-known as a photocatalyst which advances a deodorization reaction by the exposure of ultraviolet rays conventionally. On a wall surface, apply, and calcinate this with a binder, or a binder layer is formed in the front face of interior material. It is well-known by spraying a photocatalyst particle from moreover, heating after that, carrying out melting of the binder layer, cooling after that, and solidifying a binder layer to fix a photocatalyst to a front face and to give a deodorization function to the interior material (JP,5-253544,A).

[0003]

[Problem(s) to be Solved by the Invention] However, in the case of the thing of an interior material, a low eyes article of a glass fiber nonwoven fabric, etc. it is unrefined from the organic substance which cannot be sintered, the approach of said patent is impossible and the antifouling deodorization approach of still more effective elasticity sheet-like interior material was searched for.

[0004]

[Means for Solving the Problem] The photocatalyst titanium dioxide which becomes activity also by feeble ultraviolet rays like a fluorescent lamp is used for the invention in this application. It aims at offering the antifouling deodorization interior material which decomposes stinking dirt and thing origin. Let the antifouling deodorization interior material which has the antifouling deodorization structure characterized by for TiO₂ detailed powder having distributed in the fluororesin binder, and having exposed TiO₂ detailed powder from a binder front face at least, and the above-mentioned antifouling deodorization structure on an interior material body be the summary.

[0005]

[The gestalt of the actual condition of invention] Hereafter, the invention in this application is explained based on a drawing. " Drawing 1 " is the sectional view of this application antifouling deodorization structure, and the TiO₂ detailed powder 1 contains it in the front-face top of the fluororesin binder 2, and the interior.

[0006] this application antifouling deodorization structure 3 is formed by the following approaches. The drainage system dispersing element of the TiO₂ detailed powder 1 is mixed with the water dispersing element of fluororesin, on object front faces, such as interior material, a spray is applied or carried out and this is dried. By this approach, this application antifouling deodorization structure 3 which the TiO₂ detailed powder 1 contains in the front-face top of the fluororesin binder 2 or the interior can be acquired.

[0007] Although the particle size of the TiO₂ detailed powder used for this application antifouling deodorization structure 3 has desirable 0.1-10 micrometers and the mold of a crystal has a desirable anatase mold crystal, you may be a rutile mold crystal. Moreover, as for the weight

ratio of a resin binder and TiO₂ detailed powder, 10:1-1:10 are desirable. Moreover, the thickness of this application antifouling deodorization structure 3 has desirable 1-50 micrometers.

[0008] Antifouling of this application antifouling deodorization structure 3 and the mechanism of deodorization are as follows. If ultraviolet rays are irradiated by the TiO₂ detailed powder 1, TiO₂ will work as a photocatalyst, the water of adsorption on a front face and the electron hole of a photocatalyst react, and a hydroxyl-group radical (OH) is generated, and this hydroxyl-group radical and ammonia react as follows, and it deodorizes.

[0009]

[Formula 1] $\text{NH}_3 + 2\text{OH} = 1/2\text{N}_2 + 2\text{H}_2\text{O}$ [0010] In addition, the following approaches may be used in order to form this application antifouling deodorization structure 3. first, the drainage system dispersing element of fluororesin -- an object front face -- spreading -- or a spray is carried out, the powdered TiO₂ detailed powder 1 is sprinkled on it, and excessive TiO₂ is removed after desiccation. Consequently, TiO₂ detailed powder can acquire the non-calcinating antifouling deodorization structure 3 exposed to the front face of the fluororesin binder 2.

[0011] Moreover, on an object front face, a spray can be carried out, on it, a spray can be applied or carried out, spreading or the liquid which mixed the drainage system dispersing element of fluororesin for the drainage system dispersing element of the TiO₂ detailed powder 1 after desiccation can be dried for the drainage system dispersing element of fluororesin, and the antifouling deodorization structure 3 which raised the consistency of non-calcinating TiO₂ detailed powder can be acquired.

[0012] As fluororesin, an ethylene tetrafluoride copolymer and 3 fluoride ethylene system copolymer are suitable. With an ethylene tetrafluoride system copolymer, tetrafluoroethylene-hexafluoropropylene, Ethylene tetrafluoride system copolymers, such as a copolymer of tetrafluoroethylene-perfluoroalkyl vinyl ether and tetrafluoroethylene-ethylene, are illustrated. With 3 fluoride ethylene system copolymer, trifluoro ethylene-hexafluoropropylene, The copolymer of trifluoro ethylene-perfluoroalkyl vinyl ether and trifluoro ethylene-ethylene etc. is illustrated, and an ethylene tetrafluoride system copolymer, 3 fluoride ethylene system copolymer, and its mixture are chosen suitably.

[0013] It was checked that only the fluororesin used for this application antifouling deodorization structure as a binder by the result of a photodegradation trial of "Table 1" does not deteriorate according to a photocatalyst operation of TiO₂.

[0014]

[Table 1]

Resin binder Fine particles TiO₂ Moisture powder TiO₂ Mixed state PVC x x x A fluorine O O O Silicon ** ** O An acrylic ** ** ** Urethane ** ** x Vinyl acetate xx **SBR xx ** EVA xx **O: Don't discolor. **: Discolor a little. x: [0015] discolored greatly UV irradiation of fine particles TiO₂, the moisture powder TiO₂, or the mixed state was blended and carried out to the "photodegradation trial" binder, and change of the color of a binder was seen. Photodegradation is carried out, so that change of a color is large.

[0016] "Drawing 2" is the sectional view of invention-in-this-application interior material, and can be applied to flooring or a wall covering material. In the invention in this application, the interior material bodies 4 are the textile fabrics of inorganic fibers, such as organic materials, such as thermoplastics, such as PVC, polyolefine, and polyurethane, or a glass fiber, and a carbon fiber, or a nonwoven fabric, and the non-calcinating ingredient of these layered products.

[0017] In addition, in the invention in this application, it is that 350 degrees C or less whenever [stoving temperature / at the time of un-calcinating solidifying a binder] is room temperature - 200 degree C preferably. It uses for the interior material body which cannot be calcinated to the invention in this application. Moreover, this invention antifouling deodorization structure is also a non-calcinating ingredient.

[0018] This application antifouling deodorization interior material is formed by the following approaches. The drainage system dispersing element of the TiO₂ detailed powder 1 is mixed with the drainage system dispersing element of fluororesin, to the interior material by the organic substance, inorganic fibers, or these combination, such as synthetic resin, a spray is applied or carried out and this is dried. By this approach, the TiO₂ detailed powder 1 carries out the

laminating of this application antifouling deodorization structure 3 contained in the front-face top of the fluororesin binder 2, or the interior on the interior material body 4.

[0019] Moreover, as for the weight ratio of a resin binder and TiO₂ detailed powder, 10:1-1:10 are desirable. Moreover, TiO₂ can also be effectively used by applying partially the spray of the dispersing element which has the TiO₂ above-mentioned impalpable powder and a fluororesin binder to antifouling and the location for which deodorization is needed.

[0020] In addition, the following approaches may also be used in order to form this application antifouling deodorization interior material 5. first, the drainage system dispersing element of fluororesin -- interior material body 4 front face -- spreading -- or a spray is carried out, powdered TiO₂ detailed powder is sprinkled on it, and excessive TiO₂ is removed after desiccation. In this case, TiO₂ detailed powder can obtain the antifouling deodorization interior material 5 exposed on the front face of a fluororesin binder.

[0021] Moreover, on interior material body 4 front face, a spray is carried out, after desiccation, on it, a spray is applied or carried out and spreading or the liquid which mixed the drainage system dispersing element of fluororesin for the drainage system dispersing element of TiO₂ detailed powder is dried for the water dispersing element of fluororesin. Consequently, the antifouling deodorization interior material 5 which raised the consistency of the TiO₂ detailed powder whose abrasion resistance improved is obtained.

[0022]

[Example] An example is shown below.

[Example 1] the unsettled paper wallpaper after constructing indoors -- the drainage system dispersing element (STS-02(Ishihara Sangyo) TiO₂%=30wt% --) of TiO₂ What mixed 5g (SE310 (Daikin Industries) fluororesin %=50wt%) of drainage system dispersing elements and 85g of water of the fluororesin which is the mixture of TiO₂ particle size of 10g of 7nm, 3 fluoride ethylene system copolymer, and an ethylene tetrafluoride system copolymer Applied so that it might be set to 50g/m² by the spray at the time of humidity, and it was made to season naturally, and this application antifouling deodorization interior material (wall covering material) was obtained.

[0023]

[Example 2] What mixed 10g (SE310) of drainage system dispersing elements and 90g of water of the fluororesin which is the mixture of 3 fluoride ethylene system copolymer and an ethylene tetrafluoride system copolymer on the front face of PVC resin sheet flooring which manufactured by the conventional approach is applied so that it may become 50 g/m² by the spray. It sprinkled so that it might become 3 g/m² from moreover using a rotary feeder about powder titanium oxide (ST01(Ishihara Sangyo) TiO₂%=95% and TiO₂ particle size of 7nm), and after air drying, excessive powder titanium oxide was sucked up and removed by the dust collector, and this application antifouling deodorization interior material (flooring) was obtained.

[0024] The antifouling deodorization interior material obtained in the above-mentioned example disassembled dirt, such as tar of the adhering tobacco, and deodorized unpleasant smell, such as a smell of further indoor tobacco, and the antifouling deodorization engine performance was excellent.

[0025]

[Effect of the Invention]

** Effectiveness is to disassemble dirt, such as tar of tobacco.

** Effectiveness is to deodorize the unpleasant smell of others, such as tobacco.

** Since TiO₂ decomposes the origin of dirt and an odor as a photocatalyst by sunlight or ultraviolet rays, it is permanently effective.

** Disassemble neither an interior material body nor a fluororesin binder. A bad influence is not done.

** The antifouling deodorization engine performance can be given also to the interior material after construction.

** It is applicable in the large range of processings, such as surface treatment of wall covering materials, such as wallpaper, and interior decoration material, a furniture of a kitchen, and a wall surface.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

Drawing 1 ... Sectional view of this application antifouling deodorization structure

Drawing 2 ... Sectional view of this application antifouling deodorization interior material

[Description of Notations]

1: TiO₂ detailed powder

2: Fluororesin binder

3: This application antifouling deodorization structure

4: Interior material

5: This application antifouling deodorization interior material

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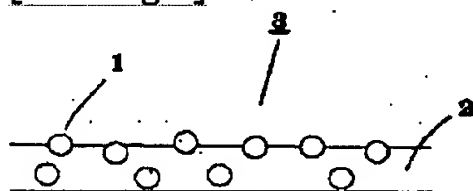
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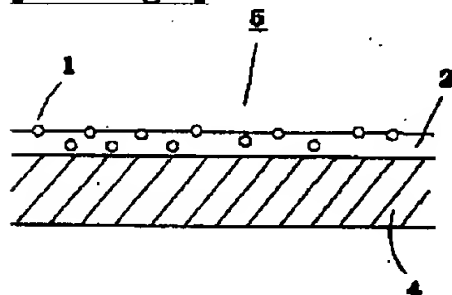
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DRAWINGS

[Drawing 1]



[Drawing 2]



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